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ABSTRACT

The report, directed toward hospital administrators, chiefs of services, and health personnel in general, outlines the work at the Center for Medical Manpower Studies (CMMS) (completed and in progress) concerned with restructuring of health occupations. Briefly described is the growth of health care services, expenditures, and personnel. Conclusions of earlier studies dealing with health manpower shortages are presented with predictions for the future. The methodology and findings of a pilot study in hiring standards for paramedical manpower are discussed which revealed that hiring standards do not reflect consideration for educational disadvantages, apparent shortages, or changes in job content. A list of eight recommendations for change presented to the Manpower Administration is included. Techniques used, findings, and conclusions are reported for an in-depth study of a single hospital, which found significant overlap of functions by the different nursing occupations studied. The hospital's positive reactions to the report's conclusions are described. Information on the establishment of CMMS, the current study on improving utilization of health manpower, dissemination of research findings, and future research plans is also provided. A list of publications of CMMS and a list of selected readings conclude the report. (Author/MS)

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RESEARCH AND DEVELOPMENT IN THE UTILIZATION OF MEDICAL MANPOWER

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PREFACE

The authors have been involved in research and development in the health manpower field since 1967. The Center for Medical Manpower Studies was established at Northeastern University in 1972, as a result of this R & D work, to act as a clearinghouse for other health manpower studies, as well as for our own ongoing research. The Center is indebted to Dr. Howard Rosen, Director, Office of Research and Development, Manpower Administration, U.S. Department of Labor and to Mr. William Throckmorton of that office. Mr. Throckmorton has had the principal responsibility of guiding us in our research and development efforts in the health manpower area.

This booklet is directed to hospital administrators, chiefs of services, and also health personnel in general. Its purpose is to outline the work completed and in progress at the Center for Medical Manpower Studies, Northeastern University, in the hope that some of our findings will prove useful to persons in the health manpower field.

Should the reader be interested in further information or want copies of our completed studies and progress reports, we would be pleased to supply such material. Please write to:

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INTRODUCTION

Growth of Health Care Services

Health care is one of the fastest growing industries in the United States. Rising real income, Medicare, Medicaid, expanded medical insurance coverage and population growth have contributed to a substantial increase in the demand for health services.

Health care-one of the fastest growing industries

The national impact of health care expenditures is indicated in the following "Calendar 1972 Highlights" published by the Social Security Administration.[1]

1. U.S. health spending totaled $89.5 billion and climbed to 7.7 percent of the gross national product.

2. The increase in total spending from 1971 was 12.4 percent, but over 1 percentage point was attributable to the addition of a new expenditure category in 1972—Medicaid payments to intermediate care facilities (ICF's), classified as "other health services."

3. Per capita expenditures amounted to $422, up $43 (11.4 percent) from the preceding year.

4. Public expenditures rose faster than private — 14.6 percent compared to 10.9 percent — although much of this difference stems from the ICF addition.

Impact of health care expenditures

5. Health insurance benefit payments grew 10 percent in 1972, but this rise was less than that in premium income. As a result, the net

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1. U.S. Department of Health, Education and Welfare, Social Security Administration, *Calendar 1972 Highlights*, Pubn. No. 11701 (1974).

cost of insurance (the difference between premium income and benefit expenditures) increased 47 percent.

6. Third parties – government, private health insurance, philanthropy and industry – met 64.4 percent of the $76 billion personal health bill. The remaining 35.6 percent was paid directly by consumers, compared to 36.3 percent in the preceding year.

7. Although the portion of the health bill paid directly by consumers has continued to decrease, the amount has continued to increase because of inflation and other factors. In 1972, per capita direct payments totaled $128, or $10 above the 1971 amount.

8. Third parties met 90 percent of the hospital bill, 58 percent of the physician's bill, 13 percent of the bill for dental care and drugs, and 60 percent of the total spent for all other services.

9. Hospital care represented the largest item of expenditure and accounted for two-fifths of the total. Spending for this purpose amounted to $34.2 billion and grew faster in 1972 than any other personal health care item except other health services.

10. Consumer expenditures, including both direct payments and insurance benefits, now account for a 6.2 percent share of disposable personal income. This proportion has increased gradually since 1929, when it was 3.5 percent.

Expenditures and Health Personnel Growth

Between 1965 and 1972, expenditures on health care skyrocketed from $39 billion to $89.5 billion,

representing an increase from 5.9 percent to 7.7 percent of the gross national product. Much of this rise resulted from expanded payrolls as employment in the industry increased from 2.7 million in 1960 to 4.4 million in 1970. Health personnel represented three percent of the civilian labor force in 1960 and five percent in 1970.

Almost 90 billion dollars spent on health care in 1972

During the decade of the 1960's the U.S. population increased by 18 percent while the number of physicians rose by 21 percent. However, the number of allied health personnel grew by whopping percentages: registered nurses, 33 percent; radiology technicians and technologists, 32 percent; nurses' aides, orderlies and attendants, 78 percent; dieticians, 53 percent; therapists, 198 percent; dental hygienists, 173 percent. At the same time the composition of the health care field shifted somewhat, with the percentage employed in higher level occupations (physicians) decreasing and those in lower skill occupations increasing.

The growth of knowledge and of new processes in the medical field has resulted in a demand for more health care manpower and the introduction of new allied health specialties. In the past five decades the ratio of health employees to physicians has risen from four to one to 12 to one. Yet, in spite of these increases, by 1970 it became apparent that allied health manpower had not increased sufficiently to meet a still more rapidly expanding demand.[2]

Health care manpower not expanding except to meet demand

2. Michael Pilot, "Health Manpower 1980," *Occupational Outlook Quarterly*, (Volume 14, Number 4, Winter, 1970), p. 2.

RESEARCH AND DEVELOPMENT STUDIES

Earlier Works

In 1967 a detailed study of health personnel in the Greater Boston Area by Dean S. Ammer reached the following conclusions:

Health manpower shortages recognized years ago

1. Demand for allied health skills will out-strip the supply in the forseeable future.
2. Institutions deal with shortages by relying on part-time or less skilled help and by providing inferior services.
3. Shortages are not uniformly distributed.
4. Wider pay differentials should be encouraged.
5. Status hungry allied health organizations indirectly contribute to the shortages.
6. Allied health middle management is poorly trained in techniques of administration.

The noted labor economist, Dr. Eli Ginzberg, of Columbia University, pointed out some ambiguities in the health manpower shortage. Virtually all fields dependent on trained manpower, he said, complain of shortages, but all will fail to meet their needs if they insist upon perpetuation of their old cumbersome patterns of staffing. Every field, including health, finds the shifting of goals and redirection of resources difficult because of inflexibility, conservative attitudes and weak leadership.

In a dynamic society time produces changes, and the institutions that were brought into being

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3. Dean S. Ammer, *Institutional Employment and Shortages of Paramedical Personnel – A Detailed Study of Staffing in Hospitals, Nursing Homes and Various Institutions in the Greater Boston Area*, Grant from the United States Public Health Service. Boston, Massachusetts: Northeastern University Press, 1967.

at an earlier period to cope with particular problems will find that some, often many, of their tasks have in fact been eroded by alterations in the environment and in the priority needs of the population. Concurrently, time brings to the fore new challenges with which established institutions will be unable to cope unless they secure additional resources of men and money. But it is clearly impossible to add indefinitely to the resources of established institutions so as to enable them to cope more effectively with the new. Other adjustments can and must be made.[4]

Health manpower shortages exist but are largely contrived – Ginzberg

Ginzberg suggests such adjustments as the elimination or merging of some tasks, reassigning others to personnel with lesser competence or less training, substituting money for manpower in the performance of some functions and transferring functions from the provider to the consumer of the service.

The Professor concedes the existence of a health manpower shortage but notes that the shortage is largely contrived by persons and institutions within the health structure.

To quote the April 1973 Committee for Economic Development Study entitled *Building a National Health Care System:*

Shortages compounded by inadequate utilization and training

> . . . Poor distribution, together with inadequate utilization, training and organization, have aggravated the shortages of manpower in some areas while causing surpluses in others. Beyond some crude and increasingly doubtful ratios of professions to population, it is not even known how many people are now needed, let alone how many would be needed under a better-organized system.[5]

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4. Eli Ginzberg and Miriam Ostow, *Men, Money and Medicine*, (Columbia University Press, New York, 1969), p. 133.

5. Committee for Economic Development, *Building a National Health Care System*, April, 1973, p. 33.

If the market for health manpower operated efficiently with no artificial barriers, supply and demand would ultimately correct shortages. Institutions would act to retain or attract employees, restructure hiring standards and pay scales, institute training programs, and explore new sources of recruitment. They have not moved adequately to correct high turnover rates, job dissatisfaction, relatively low wage levels, and limited upward mobility. Shortages have tended to reflect budgeted positions and experience in hiring and turnover rather than the need for qualified health workers.

The Future

While the shortages in the health care industry may be somewhat contrived, we must conclude that they do exist and will continue through the 1970's. We base this conclusion on the following facts:

1. Wage rates for health personnel, while still below that of manufacturing employees, have increased over the last five years at a rate higher than the average for all workers.[6]

Shortages expected to continue through the 1970's

2. Because of the nature of the service and the round-the-clock quality of the health industry, the normal attrition of the labor force is very high, and for some occupations the training is barely keeping pace with the need for replacements.

3. The enormous growth of technical knowledge has fragmented the occupations of health workers. At the beginning of this century the physician, nurse and aide were probably the

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6. *Annual Earnings and Employment Patterns of Private Non-agricultural Employees – 1965* (Washington: U.S. Department of Labor, Bureau of Labor Statistics, 1970), Bulletin 1675, table 1, pp. 9-10. *Industry Wage Survey, Hospitals, March 1969* (Washington: U.S. Department of Labor, Bureau of Labor Statistics, 1971), Bulletin 1688, pp. 14-15. These data include all hospitals except those operated by the Federal Government.

only recognized categories of health workers. In 1974 no less than 425 specialty groups, other than physicians, are to be found in the health care field. Despite the fact that in-patient occupancy rates are relatively constant, the number of health workers employed by these very same hospitals has increased substantially.

Northeastern University Studies

Hiring Standards for Paramedical Manpower

In an effort to determine whether and what kinds of artificial barriers to employment existed in the Greater Boston Area, the authors conducted a pilot study among a sample of hospitals in 1967-68 as an R & D project for the Manpower Administration, *(Hiring Standards for Paramedical Manpower)*. We gathered detailed data on hiring requirements, job performance and educational and professional backgrounds of employees in selected allied health occupations as well as information on general characteristics of the occupations such as promotional possibilities and training on-the-job. The focus of the study was on defining realistic job requirements for allied health personnel. The study involved twenty hospitals, including private, municipal, and veterans units and covered 524 workers in 22 allied health occupations. In selecting these occupations we attempted to cover a broad range of technical occupations requiring a wide variety of training.

Medical and allied health problems in the Greater Boston Area may differ from those in other parts of the U.S., and the 22 occupations we studied may not be statistically representative of all occupations. Nevertheless, we feel that a number of generalizations are warranted, even though each conclusion or recommendation may not have universal applicability, since Boston does contain more health personnel than the typical metropolitan area in the United States.

Our study developed and tested a list of functions for each of the 22 occupations and we ascertained a distribution of time spent on each function by every

person in the sample. This information on what duties these allied health persons actually performed, day in and day out, can be used as a guide for further study of the educational and training needs in allied health occupations.

Pilot Study – hiring standards and job content unchanged for many years

While accrediting agencies and professional societies have influence over the entrance requirements in some occupations, hiring standards in hospitals are generally established either on a departmental or general administrative basis. In line with pressure from the professional groups, educational institutions offer allied health training programs but entrance requirements are frequently too high to permit admission of the educationally deprived. In spite of this, in spite of the apparent shortages, and in spite of the fact that most hiring standards have been in effect for many years and that the job content of many occupations has changed, most hospitals in our study considered their standards to be appropriate.

Recommendations for change

In view of these findings we recommended to the Manpower Administration in our final report:[7]

1. A re-examination of the whole occupational structure to determine actual job requirements for each occupation.

2. Establishment of hiring standards relevant to functions performed and elimination of unneeded and arbitrary licensing and educational requirements.

3. Expansion of on-the-job training programs, concentrating on functions significant to the various occupations.

4. Establishment of training programs by educational institutions for the various allied health

7. Morris A. Horowitz and Harold M. Goldstein, *Hiring Standards for Paramedical Manpower*, A Report to the Manpower Administration, U.S. Department of Labor, September 1968, pp. IX-XV.

occupations with entrance requirements geared to the realistic needs of the occupations, thus allowing the educationally deprived an opportunity to enter them.

5. Governmental reorientation of MDTA training programs for these occupations in line with specific job requirements established by hospitals, coupled with a concerted drive to attract the disadvantaged and school dropout.

6. Examination by local governments of those licensing practices for allied health occupations which have tended to exclude the disadvantaged by means of arbitrary and unnecessary qualifications.

Because we concluded that shortages did exist in many occupations and that there was great diversity in the educational and professional backgrounds of persons employed to perform the same tasks, we also recommended the following:

7. Minimum hiring standards should be adopted which, while still providing the needed quality of service, would permit the utilization of a greater proportion of disadvantaged persons

8. Hospitals should eliminate "dead-end" jobs by creating, wherever possible, a job promotion ladder. This would attract better personnel and reduce attrition.

In-depth study of a hospital – Restructuring Paramedical Occupations

Based on this initial research, the Manpower Administration asked us to experiment with our ideas in a single hospital. A second project entitled *Restructuring Paramedical Occupations,* (RPO) was completed in 1972 after a two and one-half year study.[8] We attempted to analyze hiring requirements, duties

8. Harold M. Goldstein and Morris A. Horowitz, *Restructuring Paramedical Occupations,* A Report to the Manpower Administration, U.S. Department of Labor, January, 1972.

and functions of allied health personnel in a single hospital and to recommend changes to restructure occupations and improve manpower utilization in that hospital.

In conducting this study it was important to select a hospital that was somewhat typical and that was prepared to cooperate in our project. We sought a modest-sized hospital with a progressive and forceful administration which had a genuine interest in efficient utilization of manpower and the delivery of quality care at reasonable cost. The Cambridge Hospital, Cambridge, Massachusetts, under the supervision of Dr. James B. Hartgering, Commissioner of Health, Hospital and Welfare for the City of Cambridge, met these criteria.

An additional objective was to study and analyze the problems encountered when a hospital introduces basic changes in its occupational structure, and to decide whether such obstacles are unique or would be encountered in all hospitals.

As a city hospital, Cambridge finds the problems faced by most hospitals compounded. Its administrators, unions, professional organizations and physicians indicated a willingness to implement recommended changes.

Techniques used in study

The job analysis technique used in The Cambridge Hospital study seemed well suited to a medical setting where gathering data by observation would be hampered and unduly prolonged by the overriding necessity to maintain the privacies and the quality of patient care. Hence, the technique was based primarily on interviews.

The analysis had two broad phases – identifying functions and interpreting significance. The first required three subphases: Identifying the tasks performed in each occupation, cross-checking and ranking these tasks in order of difficulty, and gathering and cross-checking the employees' responses. The

second phase consisted of identifying significant task overlaps.

Of the voluminous statistical material gathered during the course of this study, one table proved to be crucial.

In summary the table shows the following:

Average Percent of Time Spent on Six Groups of Functions by Registered Nurses, Licensed Practical Nurses, Nurses' Aides and Orderlies

I. General Nursing		R.N.	L.P.N.	Nurses' Aide	Orderly
Groups of Functions	Functions				
(Ranked from Easiest to Most Difficult)					
1	(1-18)	24.7	31.5	40.8	40.8
2	(19-30)	26.3	28.2	38.2	26.1
3	(31-47)	20.3	22.5	6.4	15.6
4	(48-63)	16.6	8.8	3.0	3.1
5	(64-69)	3.1	0.1	2.7	5.2
6	Lunch & Break	8.8	8.8	8.8	8.8

This table combines general nursing functions by degrees of difficulty into six groups. The first four are of primary interest. Each of these four groups of functions represents duties increasing in difficulty (e.g., group 1, functions 1-18, the easiest functions, group 4, functions 48-63, the most difficult in terms of required training, on-the-job training and professional skill).

It would be well to note that the functions for each occupation were divided into levels of difficulty from reports by the physicians, nurses and specialists within each category. One can perhaps question the order of functions within any of the groups of categories, but the groupings themselves can be readily defended.

Significant overlap of functions by different occupations

Almost all persons in the four occupations, registered nurses, licensed practical nurses, nurses' aides, and orderlies, performed the easiest functions, and the table indicates that on these functions:

RNs spent 24.7 percent of their time;
LPNs spent 31.5 percent of their time;
NAs spent 48.0 percent of their time;
Orderlies spent 40.8 percent of their time.

If we now go to the more "difficult" functions (ones that are not supervisory), such as Group 3 (31-47), we see that on such functions:

RNs spent 20.3 percent of their time;
LPNs spent 22.5 percent of their time;
NAs spent 6.4 percent of their time;
Orderlies spent 15.6 percent of their time.

From an analysis of the statistical material gathered we concluded that:

1. Irrespective of the degree of difficulty inherent in the task or the educational background of the personnel involved, there was a great deal of overlap in the performance of functions at The Cambridge Hospital.

2. Although the more difficult functions were usually performed by the more professionally trained staff members, the lesser skilled allied health personnel occasionally performed these functions. This occurred most commonly during the night shift when all four groups were called upon to perform tasks normally handled by only RNs or physicians.

3. The more highly trained staff members spent large blocks of their time on tasks below their technical competence.

Conclusions of RPO Study

In addition to finding a great deal of overlap in the functions performed by nurses' aides, RNs and LPNs and a smaller amount among other allied health occupations, we found:

1. Artificial hiring standards higher than needed to perform basic tasks were common. For

example, although The Cambridge Hospital required a high school diploma for entrance level allied health employment, one-third of the nurses' aides, one-eighth of the orderlies and one-third of the ward secretaries did not possess one.

2. Educational requirements and institutional barriers prevent upward mobility among allied health occupations.

3. It was difficult to acquire training for promotion or to keep up to date in one's occupation because of the lack of in-service or on-the-job training.

In response to our findings, conclusions and recommendations The Cambridge Hospital reacted positively in the following fashion:

The hospital's reactions to our conclusions

1. It was possible, despite vested interests and institutional barriers, to institute changes in occupational functions and structures. Cambridge has started restructuring the functions of the registered nurses and licensed practical nurses, with the less difficult tasks being given to nurses' aides, nursing assistants, and medical assistants.

2. Existing duties could be broken down and new positions formed to provide a career ladder. Three new occupations – nursing assistant, medical assistant, and nurse practitioner – have been created at The Cambridge Hospital, while the position of orderly was being phased out. In-service training for these new positions provided new promotional possibilities. The position of physician assistant was tried and rejected, due to the inordinate amount of time required of physicians to supervise the training of the physician assistant. A nurse practitioner program was instituted in its place.
3. Some hiring standards have been lowered making it possible for previously disqualified

applicants to enter occupations which with in-service training provide job mobility.

4. Recently instituted on-the-job training programs will permit disadvantaged minority persons to obtain employment in allied health occupations and personnel in general to move up a career ladder.

Establishment of the Center for Medical Manpower Studies

The establishment of the Center for Medical Manpower Studies (CMMS)

After completion of the RPO study, the Center for Medical Manpower Studies was established at Northeastern University in June 1972. (Grant No. 42-25-72-10, *Improving the Utilization of Health Manpower.*) Under the aegis of the Center we are currently engaged in three related R & D projects.

CMMS current study on Improving the Utilization of Health Manpower

First, in order to determine the feasibility of our previous findings in other settings we are involving five hospitals, each with quite different characteristics. The focus of this project is (a) to implement the RPO technique and determine its applicability to other hospitals, and (b) to determine the long run impact of our recommendations at The Cambridge Hospital and the other four participating medical facilities. It is hoped that persons and institutions will recognize characteristics similar to their own among five studied hospitals and thus apply these findings as a solution to their own institutional problems.

Using pseudonyms the five hospitals can be briefly described as follows:

1. Elektra: a general, 200 bed, short-term municipal teaching hospital serving a large, low and lower-middle income urban population.

2. Bacchus: a short-term private, general, nonprofit, teaching hospital with 350 beds. It serves an upper and middle income urban population.

3. Desdemona: a private, short-term non-profit hospital of 60 beds serving a lower income urban population.

4. Adonis: a large, short-term municipal teaching hospital (pediatrics department only) serving low income residents of the inner city.

5. Cressyda: a large, short-term private, non-profit hospital of 350 beds serving a rural population of varied incomes.

At present our data are still in a preliminary form. However, there are clear indications that the findings in our two previous studies will continue to be substantiated. Because of the inclusion of institutions with well established in-service and upgrading programs for entry level personnel, the comparisons of the utilization of various categories of health manpower will be considerably more telling and significant. Physicians, interns, residents, pediatric nurse practitioners, and nurse practitioners have been included in this study along with the occupations previously studied.

Disseminating the findings of health manpower research

Our second R & D project involves disseminating and utilizing the findings of our research as well as other health manpower studies among health providers. Further, we are exploring the development of research techniques for measuring how much change has evolved through restructuring and improvements in the quality of medical services. In line with this task, we are compiling a list of "marginal medical functions" which could be performed by health personnel other than physicians.

In response to requests we have distributed over 2,500 copies of our study *Restructuring Paramedical Occupations* to health care providers, following up most requests with postcard questionnaires asking recipients about their interest in the area of allied health manpower.

Future Work

Future research plans of CMMS

Our plans over the next two years also include the publication of a do-it-yourself manual for hospital administrators, nursing directors, and chiefs of service on the specifics of restructuring paramedical occupations, with an eye to easing shortages of allied health personnel and physicians, increasing the efficient use of allied health manpower, short-circuiting arbitrary licensing requirements, and providing up-grading and promotional possibilities.

The Center will conduct workshops and seminars at the University or in areas where sufficient interest exists.

Our third R & D project, involving 250 health providers, has the following objectives:

1. To determine the changes over a five-year period in the demand for health manpower, by occupational groups, as measured by employment in the cities of Boston and Cambridge.

2. To determine whether there is an underutilization of hospital bed capacity, and if so, what effect it has on the employment and utilization of health care personnel.

3. To determine what effects the growth of non-hospital health facilities, such as neighborhood health centers, health maintenahce organizations and extended care facilities, has had on the employment and utilization of health care manpower.

SUMMARY

Our pilot study, *Hiring Standards for Paramedical Manpower,* demonstrated that we could pinpoint structural deficiencies in a large industry which has grown to tremendous proportions but has not reacted rapidly enough to meet its own manpower needs.

Our second in-depth study, *Restructuring Paramedical Occupations*, demonstrated that practical and workable techniques could be developed and applied, in a single hospital, for restructuring allied health personnel, and further, that this would be welcomed by medical personnel if handled with "tender loving care."

Our third endeavor, *Improving the Utilization of Health Manpower*, which encompasses three distinct projects, to date, has encountered little resistance (with many hurdles to overcome just in preparing the groundwork for our "intervention"). The techniques developed in the RPO study appear to be viable as a "restructuring tool".

Overall, we have demonstrated that the health services area is ripe for structural changes along industrial lines, provided that the principal actors and actresses are not threatened.

Some preliminary material including recommendations and conclusions will be available in the Fall of 1975.

Obviously the techniques described in our studies represent one possible method of improving the utilization of health manpower. There is a desperate need for cross-fertilization of ideas and methodology and we would greatly appreciate any feedback from others involved in developing alternative techniques for implementing changes. In view of the many pieces of health legislation now before the Congress, researchers in this field would do well to expedite their efforts to improve the utilization of health manpower in order to pave the way for the inevitable evolution in medical care.

While we are aware that our past and present research and development work has only scratched at the surface of the tremendous problems in the health manpower area, we do hope that the findings described above will make some contribution to this important sector of the American economy.

PUBLICATIONS OF CENTER FOR MEDICAL MANPOWER STUDIES

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